VTTBNc thin films are more suitable for using as gas sensors than Zinc or metal free TTBNc thin films with its improved morphological characteristics.

The summary and conclusion are given in Chapter 7. In conclusion, the central metal ion favours electrical, optical, structural and surface morphological properties of Tetra- Tert-Butyl 2,3 Naphthalocyanine tin films to a great extent. The transition metals with unfilled inner d-orbital like Vanadium has improved properties in the studies on comparing with Zinc and metal free TTBNc thin films due to the inner transition of majority charge carriers through the macro molecules. The future scope of this work is also indicated by combining the opto electronic features of class of TTBNc thin films with its nano regime; the materials for further investigations are suggested as interesting candidates for nano thin film device fabrications in the near future.

Most of the work presented in this thesis have either been published in journals or presented in International/ national conferences or are in the process of publications, a list of which is given below.

LIST OF PUBLICATIONS

1. Low temperature effects on electrical and optical properties of TTBNc thin films, I. Dhanya, T. G. Gopinathan, Nisha S Panicker and C.S. Menon, Journal of Non-Crystalline Solids, 356 (2010) 160-164.

2. Optical and electrical characterization of tin (II) 2,3- naphthalocyanines thin films coating containing agglomerated spherical particles, Nisha S Panicker, T. G. Gopinathan, I. Dhanya and C. S. Menon, Physica B, 405 (2010) 4556-4560.

3. Low temperature effects on electrical and optical properties of vacuum annealed Zinc Tetra-Tert-Butyl 2,3 Naphthalocyanine thin films, I. Dhanya and C. S. Menon, Journal of Nano and Electronic Physics, 3 (2011) 426-432.

4. Annealing effects on electrical, optical and structural properties of semiconducting transparent tetra- tert-butyl 2,3 naphthalocyanine thin films, I. Dhanya and C. S. Menon, Journal of Non-Crystalline Solids, 357 (2011) 3631-3636.

5. Effect of thickness on structural and optical properties of tetra- tert-butyl 2,3 naphthalocyanine thin films, I. Dhanya and C. S. Menon, E- Journal of Chemistry, 8(4) (2011) 0000-0000 (in press).

6. Surface morphological, structural, electrical and optical properties of annealed Vanadyl Tetra-Tert-Butyl 2, 3 Naphthalocyanine thin films, I. Dhanya and C. S. Menon, (accepted for publication in Vacuum).

7. Effect of substrate heating on electrical, optical structural and surface morphological properties of Tetra-Tert-Butyl 2, 3 Naphthalocyanine thin films, I. Dhanya and C. S. Menon, (Communicated to Applied Surface Science).

8. Determination of optical conductivity and different optical energy losses for non-crystalline Vanadyl tetra tert -butyl 2,3 Naphthalocyanine thinfilms, I. Dhanya and C. S. Menon, American Institute of Physics Conference Proceedings, 1391 (2011) 114-115.

9. Low temperature effects on electrical and optical properties of vacuum annealed Zinc Tetra-Tert-Butyl 2,3 Naphthalocyanine thin films, I. Dhanya and C. S. Menon, International Symposium on Semiconducting Materials and Devices, January 28-30, 2011, Department of Materials Sciences, M. S university Baroda, Vadodhara, Gujarat, India.

10. Eco-friendly gamma ray sensors using tert-butyl substituted 2,3 naphthalocyanine thin films, I. Dhanya and C. S. Menon, International Conference on Advanced Materials and Its Applications, March 4-5th, 2011, Department of Physics, Kalasalingam University, Tamil Nadu, India.

11. Determination of optical conductivity and different optical energy losses for non-crystalline Vanadyl tetra tert -butyl 2,3 Naphthalocyanine thinfilms, I. Dhanya and C. S. Menon, Optics'11, May 23-25, 2011, Department of Physics, National Institute of Technology, Calicut, Kerala, India.

12. Effects of air annealing on thermal activation energy of Tetra-tert-butyl 2,3 naphthalocyanine thin films, I. Dhanya, T. G. Gopinathan, Nisha S Panicker and C. S Menon, National Seminar on Photonic Materials, February 26-28, 2009, Department of Optoelectronics, University of Kerala, Kariavattom, Thiruvananthapuram.

13. Effects of air annealing on optical and structural properties of Tetra- tert- butyl 2, 3 Naphthalocyanine thin films, I. Dhanya, T. G. Gopinathan, Nisha S Panicker and C. S Menon, National Seminar on Nano Science and Technology, March 23-25, 2009, Postgraduate Department of Physics, Fatima Mata National College, Kollam, Kerala.

14. Structural Properties of nano porous TTBNc thin films, I. Dhanya, T. G. Gopinathan, Nisha S Panicker and C. S Menon, National Seminar on Recent advances in Nano Science and technology, October 7-9th, 2009, Department of Physics, Sree Narayana College, Kollam, Kerala.

15. Naphthalocyanine thin films for laser window applications, , I. Dhanya and C. S. Menon, 21st Swadeshi Science Congress, November 7-9th, 2011, Swadeshi Science movement and Cashew Export Promotion Council of India, CEPC Laboratory and Technical Division, Cashew Bhavan, Kollam, Kerala.

16. Optoelectric properties of Tert-Butyl substituted Zinc Naphthalocyanine thin films, I. Dhanya, T. G. Gopinathan, Nisha S Panicker and C. S Menon, (Accepted for Presentation in National Conference on Recent Advances in Materials science, December 19-21, Research Department of Physics, Kuriakose Elias College, Mannanam, Kottayam, Kerala).

17. Optical studies of substrate heated Tetra- tert- butyl 2, 3 Naphthalocyanine thin films, I. Dhanya, T. G. Gopinathan, Nisha S Panicker and C. S Menon, State level Workshop on Advanced Quantum Mechanics, September 23-25, Research Department of Physics, Kuriakose Elias College, Mannanam, Kottayam, Kerala.